

Director Charles Groat Remarks at the Integrated Earth Observation System Workshop, Washington, DC, May 9, 2005. "IEOS: An Overview of the Societal Benefit Areas"

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Introduction: An Overview of the Societal Benefit Areas

There are many successes to report on the remarkable journey toward improving Global Earth Observation capabilities internationally and for the Nation. First, motivated by a growing need to understand earth systems and processes and to better serve societal needs we have gathered as a community to find ways to leverage our technical capabilities to achieve the laudable vision of an interoperable system of systems that allows for efficient and effective data integration and exchange. I am grateful to be here to speak to the topic of collaboration and to outline the nine benefit areas, which are the heart of GEOSS. Like the internationals, the U.S. agencies are not creating a big international database or a single new system. We are using the resources of all of the participating organizations to create a system of systems. This system of systems will better satisfy user needs than the individual components or system of which it is composed.

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Strong National Support

Just as the international GEOSS is based on a strong foundation of support by sixty nations and forty International organizations, the U.S. effort has firm support from 15 federal agencies and The White House. The U.S. also seeks to involve academia, National Geospatial Organizations, and commercial enterprises in the IEOS implementation.

Its vision: Enable a healthy public, economy, and planet through an integrated, comprehensive, and sustained Earth observation system.

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US Contribution to GEOSS: US Integrated Earth Observation System

The U.S. contribution to GEOSS is The U.S. Integrated Earth Observation System (IOES). The vision is to enable a healthy public, economy, and planet through integrated, comprehensive and sustained Earth observations. The U.S. strategic plan identifies the

U.S. capabilities are part of the systems of systems, both nationally and internationally. It builds on existing observing capabilities, and highlights the need to fill gaps where they exist. It uses common standards and is compatible with the international architecture.

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Nine Societal Benefits

These are the nine Societal Benefits of GEOSS.

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IEOS Benefits

The IEOS Societal benefits areas are similar but distinct from GEOSS areas, for example: The international concern is for Weather Forecasting and the IEOS focus is on improving Weather Forecasting.

These are the nine IEOS Societal Benefits of IEOS:

Improve Weather Forecasting; Reduce Loss of Life and Property from Disasters; Protect and Monitor our Ocean Resource ; Understand, Assess, Predict, Mitigate, and Adapt to Climate Variability and Change; Support Sustainable Agriculture and Forestry, and Combat Land Degradation; Understand the Effect of Environmental Factors on Human Health and Well-Being; Develop the capacity to Make Ecological Forecasts; Protect and Monitor Water Resources; Monitor and Manage Energy Resources

These benefit areas are National priorities. IEOS can improve coordination of strategies and observation systems, link all platforms: in situ, aircraft, and satellite networks, and identify gaps in capacity by facilitating the exchange of data and providing adequate info to decision-makers.

I'd like to give you the flavor of a few of the benefit areas.

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Improve Weather Forecasting

The current weather system provides billions of dollars in value to the nation in areas such as transportation safety, agricultural productivity, and energy management.

Enhanced observations would greatly facilitate the weather mission in the U.S., as well as supply crosscutting information for the user requirements in the other societal areas.

What if we could successfully integrate all of our systems-research and operational? We could potentially have more precise assessments, better models, and more accurate forecasts.

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Reduce Loss of Life and Property from Disasters

Natural disasters **afflict all regions of the world**, and improved global disaster reduction and warning is a shared, global need. **Disasters killed 500,000 people and caused \$750 billion of damage over the decade 1990-1999**, according to data presented in the "Living with Risk" report of the UN International Strategy for Disaster Reduction (ISDR).

This year there was the Tsunamis in the Indian Ocean, four hurricanes in the U.S., Mount St. Helens awakened in the eve of her 25th Anniversary, and Landslides that plagued southern California. All brought relevance the relevance of this Benefit area in the forefront. The risk

indicates what IEOS could enable and the desired outcome, which is Science and technology working together for a desired societal outcome – early warning and greater response time.

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Wildfire

Wildfire is another area in which IEOS can be particularly useful. Wildfires have **global implications and Integrated Earth Observation systems can provide information to provide better tracking and prediction capabilities**. A desired outcome the international and national plans is the development of a global disaster reduction and warning system for hazards such as earthquakes, volcanoes, floods, hurricanes and drought. Although damage cannot be completely avoided, better coordination of observation systems and data will reduce losses and help protect the public.

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Protect and Monitor our Ocean Resource

The focus is on **strengthening an ocean observation system, which is critical for addressing pollution, habitat degradation and natural disasters**.

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Ocean and Coastal Resources

[Regional scale initiatives] In the Caribbean, NOAA is involved in “White Water to Blue Water,” this is an international effort to promote the practice of integrated watershed and marine ecosystem-based management to support sustainable development.

It involves governments, intergovernmental organizations, universities, and the private sector. It was intended to help implement US Presidential Type II initiatives from the World Summit on Sustainable Development.

Sustainable development requires cooperation among the full range of upstream and downstream stakeholders, and this effort will help us to understand and recognize connection between sectors.

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Water Resources (cont’d)

An ocean observation system for the Caribbean region (including Remote sensing platforms) is a critical component. Data will be widely available and used by technical experts, policymakers and the public in their decision making regarding the development of water shed and marine ecosystems.

The benefits could be far-reaching – healthy, well-managed and productive marine and coastal ecosystems that support economies and livelihoods in coastal countries. This is the basis for economic growth (development) and social well-being.

Slide 12 Climate Variability & Change

IEOS will help to build a better understanding of climate variability and change. President Bush put a special emphasis on this particular societal benefit when he endorsed the U.S. Climate Change Program. The program's focus is on integrating federal research on global change and climate change. Earth observation can monitor effects of climate change and help to predict droughts.

Slide 13 Drought

Drought is one hazard that affects virtually all regions of the world, including the U.S. FEMA estimates annual losses in the United States due to drought at \$6-8 billion.

Drought is particularly severe in the Western United States, currently in its fifth year.

Slide 14 Combat Desertification & Drought

GEOSS recommendations were to fully integrate in situ & satellite observations, in addition to the development of a drought early warning system. The U.S. plan also emphasizes the importance of developing a drought early warning system.

Slide 15 Support Sustainable Agriculture and Forestry, and Combat Land Degradation

Agricultural production is dependent on a healthy environment and sound agricultural planning.

Slide 16 Observations to Information Agriculture

Production is tied to healthy environment and sound planning. A healthy environment entails reducing soil erosion, protecting water resources, and reducing pollution. Land use assessments are necessary to understand suitability and productivity. **Earth Observations are essential to produce maps of the land surface and topography to map vegetation and land use gather data on air humidity and soil moisture, and to characterize the quantity and the seasonal variation of precipitation.**

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Observations to Information Agriculture

Clearly no one single action can increase agricultural production as all the many factors involved need to be taken into account. This is valuable information for governments & stakeholders trying to estimate requirements in areas at risk.

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Observations

The **benefit is to make decisions based on sustainable agriculture practices**, while using the information **to help predict and understand droughts, harvests and the potential for crop damage**.

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Effect of Environmental Factors on Human Health & Well-Being

We are only beginning to comprehend impact of environmental phenomena on human health issues, for example, the U.S. is examining linkages between ocean phenomena and human health environmental trends on human health.

An estimated 300-500 million people worldwide are infected with malaria each year; about 1 million die from the disease. Trends show “normal annual cycle of malaria is intensified during El Niño events (local, regional, and national levels).

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Partnerships – addressing the issue

1) Columbia University, **The International Research Institute (IRI)**, partnered with the World Health Organization, USAID, and USGS.

2) **University of Alabama at Huntsville**, partnered with NASA:

Both groups are using Earth observations, namely satellites, coupled with computer models [temperature, humidity, vegetation and soil moisture] to predict when and where mosquitoes may cause an epidemic. The main objective is to provide the tools and training to develop a capacity in malaria control for improved decision-making, i.e., develop an early warning system. This is a very important issue in some developing parts of the world – Asia, Africa, and South America, however, the science behind it is useful in the U.S. as well.

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Develop the capacity to Make Ecological Forecasts

The primary goal of ecological forecasting is to predict the effects of biological, chemical, physical, and human induced pressures on ecosystems and their components at a range of scales over time, given a certain set of assumptions. Ecological forecasting requires the acquisition of a wide range of environmental data, as well as development of models. Environmental scientists have modeled and predicted the effects of local, regional and global climate change on Earth's species of plants and animals. Land planners and policy-makers have used technology to identify the highest priority areas for biodiversity conservation.

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Protect & Monitor Water Resources

The Great Lakes has one-fifth of the Earth's freshwater and are one of the Nation's most important aquatic resources from an economic, geographic, international, ecological, and societal perspective. Extreme natural events such as storms, erosion, high and low water levels all influence water quality and effort to restore habitat.

The availability and quality of freshwater for humans is critical in influencing the health and livelihood of people across the nation. Over one billion people in the world are currently without safe drinking water.

By providing more complete and detailed water information and forecasts, people and decision-makers could make better decisions on water supplies and activities that affect humans, plants and animals.

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Water Resources Vision

Here's a representation of some of the integrated water resources products and services we envision for the future...

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Monitor and Manage Energy Resources

Energy availability, use and cost vary regionally. Focused efforts with improved Earth observations can help to optimize decision-making, and help provide needed energy supply.

Gulf of Mexico Production:

5.1 Trillion cubic feet of natural gas per year, -27% of U.S. production

More than 1.2 million barrels of crude oil per day – 21% of U.S. production
6400 producing wells
4000 active platforms
29,000 miles of pipelines

Value is based on analysis of pre-2000 hurricane forecast information

As increases in production shift more to deep-water tracts which are more vulnerable to storm events, value of hurricane forecasts information will likely rise.

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Earth Observation Information (Summary)

The U.S. Strategic Plan for IEOS is a major initiative to achieve better results from Earth Observations programs. Our focus today is on the nine Societal Benefit Areas in IEOS as I have outlined them here. Of course, many of you are experts in these areas and we're counting on you to provide essential guidance to make this initiative a success.

Next we will be moving to the breakout groups -- Teresa Fryberger will explain what needs to happen to get us there.